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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/890,066	07/26/2001	Kazuto Nishida	2001-1055A	5756

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WASHINGTON, DC 20006-1021

EXAMINER

HARAN, JOHN T

ART UNIT	PAPER NUMBER
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1733

DATE MAILED: 05/05/2003

8

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/890,066

Applicant(s)

NISHIDA ET AL.

Examiner

John T. Haran

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 March 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-71 is/are pending in the application.
- 4a) Of the above claim(s) 1-24, 28, 31, 32, 34, 35, 41-63, 65-68, 70 and 71 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 25-27, 29, 30, 33, 36-40, 64 and 69 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 1 and 5.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Election/Restrictions

1. Applicant's election of Group VI, claims 25-27, 29, 30, 33, 36-40, and 69 in Paper No. 7 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

Claim Objections

2. Claims 25, 30, and 33 are objected to because of the following informalities: It appears the word "similarly" should be - - similar - -. Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 30 and 37-40 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 30 recites the limitation "the gold bump" in lines 2-3 of claim 30. There is insufficient antecedent basis for this limitation in the claim.

Claims 37-40 are confusing. It is unclear how many portions there are supposed to be. Claim 37 indicates there are two portions, but claim 38 appears to have more than two portions. It is also unclear if the portions are separate layers of a multilayer insulating resin film or part of a single insulating resin film. It appears Applicant is attempting to claim the embodiments described in Figures 28A-D and 29A-D. It is

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suggested to more accurately describe what Applicant is attempting to claim. For instance claim that the insulative resin sheet either has an upper region, middle region, and lower region and the comparative amounts of filler in each region or that the resin sheets is multilayer with an upper layer, middle layer, and lower layer and the comparative amounts of filler in each layer.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 25-27, 29-30, 33, 64, and 69 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nishida (WO 98/30073) in view of either Higashi et al (U.S. Patent 6,207,549) or Horibe et al (U.S. Patent 6,112,969).

Nishida teaches an electronic component mounting method and apparatus wherein a ball is formed at a tip of metal wire and is formed into a bump by bonding the ball to an electrode of electronic component; mounting the electronic component on a circuit board while aligning the electrode of the electronic component with an electrode of the board with an insulative thermosetting resin mixed with organic filler interposed inbetween and the mounting occurs without leveling the formed bump; and the electronic component is subsequently bonded to the circuit board by hardening the thermosetting resin sheet while correcting the warp of the board and crushing the bump with a pressure force of not smaller than 20 gf per bump by means of a tool and heat is

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applied heat is applied with the bonding tool so that electrodes of the component and board are electrically connected (See Columns 13 and 14; Figures 1-4). It is noted that EP 0954208 is relied upon as an English translation of Nishida (WO 98/30073).

Regarding claims 25, 33, and 64 Nishida is silent towards forming the ball into a bump by thermocompression-bonding with supersonic waves by means of a capillary. However, it is well known and conventional to form a ball on the end of a wire into a bump by thermocompression-bonding with supersonic waves by means of a capillary, as shown for example in Higashi et al (Column 9, line 59 to Column 10, line 28) and Horibe et al (Column 4, lines 25-35). It would have been obvious to use well known and conventional means to thermocompress the ball into a bump with supersonic waves by means of a capillary to bond the bump to the electrode of the electronic component in the method and apparatus of Nishida as suggested by either of Higashi et al or Horibe et al.

Regarding claim 26, Nishida teaches shaping the tip of the formed bump to prevent collapse of the neck portion during pressurizing. (See Figures 3A-3C).

Regarding claim 27, Nishida teaches having an epoxy resin with an inorganic filler (Column 13, lines 34-36), however is silent towards the weight percentage of the filler. One skilled in the art would have readily appreciated that the weight percentage would depend upon the materials worked upon and that the weight percentage of the inorganic filler would have been within the purview of one skilled in the art.

Regarding claim 29, Nishida teaches placing a solid thermosetting resin sheet having a shape dimension smaller than an outside dimension of connection between

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the electrodes of the electronic component on the circuit board before the positional alignment (Column 4, lines 17-25).

Regarding claim 30, Nishida teaches the bump having a conical tip that is not flat (See Figure 2G) and while it is silent towards using gold wire or a capillary with a chamfer angle not greater than 100 degrees, such is well known and conventional, as shown for example in Higashi et al (Column 11, lines 23-26).

Regarding 69, Nishida teaches the inorganic filler being silica (Column 13, lines 35-36) and one skilled in the art would have readily appreciated the silica is either spherical or pulverized. Furthermore, one skilled in the art would have readily appreciated that silica is exemplary and it would have been obvious to use similar inorganic fillers. It would have been obvious to use inorganic fillers that are pulverized or spherical silica or the like in the method of Nishida.

7. Claims 36 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nishida (WO 98/30073) in view of either Higashi et al (U.S. Patent 6,207,549) or Horibe et al (U.S. Patent 6,112,969) as applied to claim 25 above, and further in view of Yamaguchi (U.S. Patent 5,686,703).

Nishida et al is silent towards the thermosetting insulating resin sheet filled with an inorganic filler having a plurality of types of inorganic fillers. It is noted that Nishida also teaches use anisotropic adhesive filled with conductive particles such as nickel (which is inorganic) but is silent towards the resin having a plurality of types of inorganic filler (Column 15, lines 39-41).

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Yamaguchi teaches an anisotropic conductive film comprising an insulative adhesive filled with electrically conductive inorganic nickel particles and inorganic glass particles to reduce thermal expansion used to bond electronic components to circuit boards (Column 2, lines 1-15). One skilled in the art would have readily appreciated that the nickel and glass particles have different mean particle diameters. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the anisotropic film of Yamaguchi in the method of Nishida et al in order to reduce thermal expansion problems during heating and bonding as suggested in Yamaguchi.

8. Claims 37-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nishida (WO 98/30073) in view of either Higashi et al (U.S. Patent 6,207,549) or Horibe et al (U.S. Patent 6,112,969) as applied to claim 25 above, and further in view of Kaneda et al (U.S. Patent 6,223,429).

Regarding claims 37-40, Nishida is silent towards the distribution of the inorganic particles throughout the resin sheet or whether the resin sheet is multilayer, however it is well known and conventional for resin sheets to have different amounts of inorganic filler in different regions or portions of the sheet, as shown for example in Kaneda et al (See Figure 2), and one skilled in the art would have readily appreciated having different amounts of inorganic filler in different regions in order to facilitate adhesion with varying types of substrates. It would have been obvious to have the various claimed inorganic filler distributions in the resin sheet in the method of Nishida, as modified above.

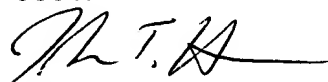
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Conclusion


9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **John T. Haran** whose telephone number is **(703) 305-0052**. The examiner can normally be reached on M-Th (8 - 5) and alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael W. Ball can be reached on (703) 308-2058. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.


John T. Haran

April 30, 2003


Michael W. Ball
Supervisory Patent Examiner
Technology Center 1700